***10-Minute University*™**
The Clackamas County Master Gardener Association in collaboration with and in support of the OSU Extension Master Gardener™ Program

Greenhouse Gardening 101

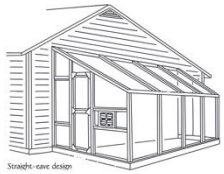
Introduction
The addition of a greenhouse to a home garden can provide an early start on the growing season and extend the season in the fall. It can also provide protection for temperature sensitive plants. And, on the human side, it can be delightful to be gardening in the dead of winter while protected from the elements. A greenhouse can be as simple as a unit in a window opening or as complex as a structure complete with high insulation values, automated heating systems, plumbing, fans, and ventilation equipment.

Determine Your Greenhouse Gardening Goals
Cool House – Perfect for gardeners who live in a mild climate and want to overwinter plants and start seeds in the spring. This type of greenhouse keeps the greenhouse at 40 degrees and above.
Warm House – For gardeners who live in a cold climate and want to grow orchids and citrus trees. Nighttime temperatures around 55 degrees work well.
Hot House – Designed for gardeners who want to grow tropical plants and require nighttime temperatures of no less than 60 degrees.

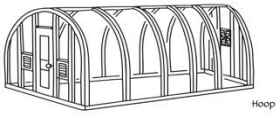
Determine the Location
The more sun the better, especially in the winter. Greenhouses are best oriented with the long side facing south or east. Greenhouses facing west run the danger of getting too hot, while greenhouses facing north are best suited for plants with low light requirements. Placement near deciduous trees can allow sunlight in during the colder months of the year but provide welcome shade during hot summers. A site that is level and has good drainage is optimal. A semi-pit or pit greenhouse, with one or more sides below grade, can be built into a slope, providing more insulation.

Depending on locale, Homeowners Associations and local governmental agencies may have restrictions on greenhouse placement. Check with the authorities early in the process to see if permits are required.

Types of Greenhouses
Attached Greenhouses are attached on the long side of the greenhouse or at the gable end to a wall of the house or garage. Pros – Can be less expensive and provide more protections from the elements with one side sheltered by a structure. Electricity and water are usually close by. Proximity to the house can be a benefit in inclement weather. Cons – The height may be restricted by the building structure. A good vapor barrier is needed to keep the humidity from the greenhouse from seeping into the house insulation.



Free-standing Greenhouses stand apart from other structures. Pros – They have more flexibility in placement and provide more light. There are a wide variety of design options, and it is easier to expand the structure by adding on to the ends. Cons – You must bring water and electricity to the greenhouse. Heating costs are higher due to the larger wall area and exposure to the elements.



Foundations –
Foundations are required on many greenhouses, and can be constructed of treated wood, masonry or concrete. It is important to construct the foundation to the specifications of the greenhouse you plan to install.

Framing Materials
Galvanized Steel – Most common for hoop or gothic style greenhouses. A galvanizing solution is required to keep the steel from rusting.
Aluminum – A popular option for many greenhouse kits, it is durable, lightweight, and comes in several colors.
Wood – Providing the most insulation factor, wood is popular for people who want to build their own greenhouse. Pressure treated wood will last longest, and is best for wood with ground contact. Redwood, cedar, and white oak heartwood can be very decay resistant as well. Painting or staining the frame before assembly also extends the life.

Glazing Materials
Glass is the traditional greenhouse glazing. It offers the most light transmission and makes it pleasant to see out into the garden. Single pane glass has a light transmittance of 85% - 95%. Double paned glass may break with fluctuations in temperature. Factory sealed, double paned panels, transmit 70% - 75% of light.
Polycarbonate – Lighter in weight than glass, it requires less structural framing. Twin wall polycarbonate is an excellent choice for greenhouse roofs due to light diffusion and resistance to breaking. Light transmission is 83%.
Plastic is used for hoop houses. Clear 6 mil transmits 87% of light. White 6 mil transmits 40%.

Utilities –
Electricity – Electricity in the greenhouse provides flexibility with how the greenhouse is used. Grow lights, heat pads, fans and heaters all require electricity.
Water – Easy access to a hose will save time and labor.
Gas – Another option for a heat source. Proper ducting and ventilation is required.

Accessories –
Heaters – Even a Cool Greenhouse may need some heat to keep temperatures above freezing. Supplementary heat can be as simple as a space heater or solar mass. To provide warmer temperatures, a 220 V circuit may be required.
Thermometers – A minimum/maximum thermometer will monitor the high and low temperatures. Thermometers with blue tooth can immediately alert you when temperatures are too low or too high.
Air circulation and temperature control – Providing good air flow is important for healthy plants. Place vents on the roof and lower in the greenhouse so air can move through and escape on hot days. A fan circulates air to improve heating in the winter and cooling in the summer.
Seed Starting Mats warm the growing medium to speed up germination.
Lighting comes in a variety of installation and bulb options. Lights that are hued toward the blue spectrum promote foliage, lights toward the red spectrum promote blooming. When starting seeds, light fixtures should be placed approximately 4” from the surface of the growing medium, then raised as the seedlings grow.

For More Information – Greenhouses for Homeowners and Gardeners (NRAES 137)
https://ecommons.cornell.edu/items/5df07397-71e4-465d-b90f-4ed9032fb301

Oregon State University Extension Service prohibits discrimination in all its programs, services, activities, and materials on the basis of race, color, national origin, religion, sex, gender identity (including gender expression), sexual orientation, disability, age, marital status, familial/parental status, income derived from a public assistance program, political beliefs, genetic information, veteran’s status, reprisal or retaliation for prior civil rights activity. (Not all prohibited bases apply to all programs.)